



Human Factors Reference Guide

Human factors is the science of designing systems, processes, and documents for the way humans actually perform (not the way we wish they would). In high-risk industries like nuclear, fossil, hydro, and utility operations, human factors is the difference between a procedure that works under pressure and one that fails when it matters most. Good procedure writing is about technical accuracy, but also about understanding that the person following your document may be fatigued, working under time pressure, or dealing with an abnormal situation they have never encountered before. Your procedure has to work even on their worst day.

The Core Principles

1. Skill-Based, Rule-Based, and Knowledge-Based Performance

Workers operate at three levels of cognitive performance.

- **Skill-based** performance is highly automated: experienced workers executing familiar tasks with little extra thought.
- **Rule-based** performance involves consciously following stored rules or procedures in familiar situations.
- **Knowledge-based** performance kicks in during unfamiliar situations where no rule or automatic response exists and it carries the highest error rate.

Each level has its own error type. Skill-based errors are slips and lapses, doing something automatically but incorrectly. Rule-based and knowledge-based errors are mistakes, conscious decisions that go wrong. Well-written procedures support all three levels by providing clear guidance that reduces the likelihood of error regardless of where the worker is operating.

2. Single Points of Attention

The human brain processes one action at a time most reliably. When a procedure step asks a worker to do multiple things simultaneously, the probability of missing something increases significantly. One step. One action. One focus. It is that simple and that important.

3. Placement Matters

A warning that appears after the action it is meant to prevent is useless. Cautions, warnings, and notes must appear immediately before the step they apply to. If the worker has already performed the action before reading the warning, the warning failed.



4. Active Voice Always

"The valve should be opened" is not a procedure step, it's just a suggestion. Active voice sentences such as "Open valve V-101" eliminate ambiguity about whether the action is required. Passive voice is one of the most common procedure writing mistakes.

5. Consistency Builds Trust

Workers build mental models around the documents they use repeatedly. When format, terminology, and writing style are inconsistent, those mental models break down and cognitive load increases. Consistency is not a style preference, it's a safety mechanism.

6. Write for the Worst Day

Your procedure has to work when someone is fatigued, stressed, or under time pressure. If it only works under ideal conditions, it's not a good procedure. Always ask: would a qualified but inexperienced worker be able to follow this step safely, alone, with no supervision, on their worst day?

7. Validation is Non-Negotiable

If a procedure was not walked down in the field, it wasn't validated. What looks logical at a desk can fail completely at the job site. Field validation catches errors, identifies physical challenges, and confirms that the document actually supports the worker.

Putting it all Together

Human factors is a mindset. When these principles are embedded into every procedure your organization produces, you're writing better documents and building a culture where workers are set up to succeed... even under the most challenging conditions. If you're not sure whether your procedure program reflects these principles, that is exactly what Praxis Procedures is here to help you find out.

Want to see these principles in action? Download our companion resource: *10 Procedure Pitfalls and How to Fix Them* at www.praxisprocedures.com.